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ABSTRACT

The author discusses how land activities can be adapted to water so that individuals with handicapping conditions can participate in circuit training activities. An initial section lists such organizational procedures as providing vocal and/or visual cues for activities, having assistants accompany the performers throughout the circuit, and devising stations with multipurpose equipment to insure individualization. Safety considerations are briefly addressed. A listing of equipment, training benefits, and activities includes 10 stations, including a modified step test and a cone obstacle course. Diagrams and text describe weight training, bar exercises, interval training (for physical conditioning), and alternate swimming. (CL)

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ADAPTING AQUATIC CIRCUIT TRAINING FOR SPECIAL POPULATIONS

Kathleen Thome

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Aquatic environments have long been recognized among the most complete settings for individuals possessing handicapping conditions. These environments can be used for rehabilitation and therapy, instruction and education, recreation and leisure, competition, and FUN. Various methods, techniques, and teaching strategies used successfully in the gymnasium, on the playground, and on the field of sport can easily be adapted for and used in aquatic environments of different types and descriptions.

Circuit and interval training are examples of sound teaching and training approaches that have been used successfully in water in general and with individuals possessing handicapping conditions in particular. Kathleen Thome has drawn from experiences in several states and in Sweden to share through this Practical Pointer ideas and ways in which circuit and interval training can be adapted for and used in water with individuals possessing handicapping conditions. Many of these activities and approaches were used by the author at Fryk Center, Torsby, Sweden. For her personal and professional contribution, thanks, appreciation, and well done are extended to Kathleen Thome.

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Land activities and exercises can be adapted to water so that individuals with handicapping conditions can participate in circuit training activities.[1] Movement in aquatic environments provide periods of training and relaxation for improving and maintaining balance, gait, muscular and cardiovascular strength and endurance, power, agility, coordination, and flexibility. Stations developed to enhance water adjustment and swimming skills are also appropriate for special and mainstreamed classes including swimmers and non-swimmers of all ages, types, and severities of handicapping conditions.

Continuous rotation to activity stations for pre-determined time periods allows every performer to be active at the same time. Adjusting performance standards when designing each station allows for individualization and personalization.

ORGANIZATIONAL PROCEDURES

Organizational procedures for aquatic training circuits include --

- Develop one activity or exercise station per participant so that each station has specific goals and objectives.
- Place stations in shallow water for accessibility to non-swimmers and swimmers of all ability levels.
- Fasten weights on light equipment that may float out of position and cause difficulties for performers.
- Space stations to insure sufficient performance areas.
- Specify work period times--i.e., two or three minutes; base these times on performer ability levels and difficulty of exercises and activities.
- Provide vocal and/or visual cues for start, stop, and rotation signals.
- Describe stations and direction of rotation in the circuit to assistants and performers before activities begin; demonstrate as appropriate and necessary.
- Use signal to start performers at initial stations; stop on signal after designated time has elapsed; allow time for rotation to the next station before activity time period starts again.
- Have assistants accompany the same performer throughout the circuit or stay at a specific station and assist performers at that station and during rotation to the next station.

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[1] Circuit and Station Activity Approaches (Practical Pointer Volume 1, Number 2, #245-26128, August 1977) presents circuit and station approaches that can be adapted and organized so individuals with handicapping conditions can participate actively in any setting--gymnasium, playfield, playground, swimming pool, athletic field, and classroom. Copies can be obtained for $2.00 from AAHPERD Publications, P.O. Box 704, 44 Industrial Park Circle, Waldorf, Maryland 20601.

- Keep stations consistent over a period of time so performers become familiar with the circuit and its activities.

- Complete the total circuit and note number of repetitions performed at each station.

- Repeat the circuit after all stations have been completed; attempt to surpass previous records at each station.

- Modify activities by moving backwards or sidewards through all exercises.

- Perform exercises as quickly as possible and note numbers completed in each time period.

- Keep records of performances at each station for comparison and evaluation, to show personal progress, and for necessary documentation of individual achievement and growth.

- Alter patterns, directions, and speed of movements to increase difficulty of the total circuit and activities at individual stations.

- Develop performance goals based on numbers of repetitions or sets of exercises that can be performed over the entire circuit in all-out efforts at each station; increase these goals--based on each individual's capacity--for new performance goals.

- Challenge performers to complete as many stations as possible in specified time periods.

- Increase clarity and understanding of circuit activities by pre-teaching water circuits on land.

- Reinforce activities through drawings and simplified written directions of the total circuit; post cards describing each station in writing, drawings, or visual cues on pool walls and/or in plastic bags or bleach bottles sealed with water-proof plastic tape.

- Repeat the circuit until a thorough understanding of procedures is assured; alter or add new stations in successive lessons and repeat them for performer familiarity.

- Develop stations with advice and assistance of medical professionals, adapted physical education specialists, therapeutic recreation personnel, physical and occupational therapists, and certified swim instructors.

- Devise stations with multi-purpose equipment to insure individualization and personalization. Use of special aquatic therapy equipment is not necessary. Equipment used on land can be adapted to water by...

  ...weighting down rust proof plastic or aluminum chairs, tables, and benches for activities performed in sitting, prone, and supine positions;

  ...using hula hoops, unfilled plastic bottles or jugs, plastic cones

or markers, buckets, and poles for aquatic therapy and skill training; and

...using non-rust weights, bricks, and similar heavy objects wrapped, tied, or sewn into material sacks with strings as weights for all equipment.

- Devise your own aquatic circuit activities by using and adapting land exercises, activities, and equipment.

- Use each station as an activity or exercise station rather than as part of a circuit.

- Select activities for conditioning or practicing specific aquatic skills by setting-up stations for kicking, bobbing, treading, bracketing and doing crawl arm stroke, diving for weighted objects, diving, or stroking (complete crawl or backstroke); establish stations to meet needs of individual performers.

SAFETY CONSIDERATIONS

Bouyant properties of water make aquatic settings suitable training environments for individuals with impairments, disabilities, and handicapping conditions. Resistance of water helps participants develop muscular strength and endurance as well as restrains individuals needing to relax and decrease movements. Aquatic environments can equalize performance and challenge levels for participants with and without handicapping conditions. Properties of water can be enjoyed by everyone providing safety is a major concern of all involved. Representative of types of information necessary for safety of participants in aquatic programs and environments include --

- Health history of each participant. Does the individual have any reactions to water--i.e., skin, eye, nose, throat sensitivities? Seizures? Fear?

- Does the participant have previous water or swim experience?

- Are assistants and instructors aware and trained in basic water safety and first aid? Are they aware of signs of fatigue? Seizures? Medical complications? Limitations of performers?

Similarly, performers should be aware of basic safety practices in water --

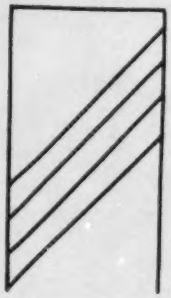
- Recognize fatigue and chill as signs to stop performances.

- Be knowledgeable of and skilled in arm and leg movements to recover from prone and supine float and submerged positions.

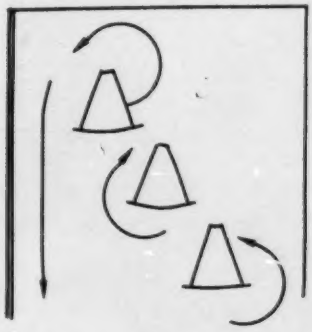
- Understand pool entries and exits and be familiar with depth and properties of water for ease in water adjustment.

A MODEL AQUATIC TRAINING CIRCUIT[1]

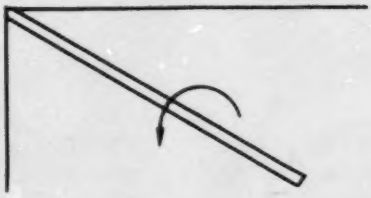
Station #1
Modified Step Test



Station #2
Cone Obstacle Course

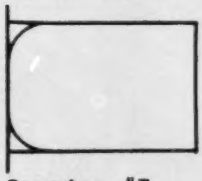


Station #3
Extension Pole

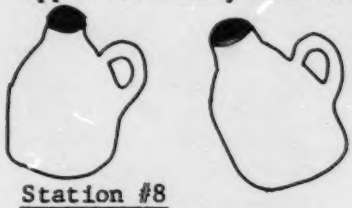


Station #4
Hula Hoop

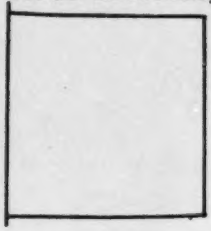
Station #5
Water Chair



Station #6
Upper Extremity Exercises

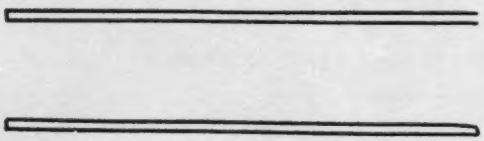


Station #7
Lower Extremity Exercises



Station #8
Water Stairs

Station #9
Parallel
Bars



Station #10
Bucket and Hoop Games

[1]See pages 7 and 8 for specific information about equipment, training benefits, and activities associated with each station.

Station	Equipment	Training Benefits	Activities
#1 Modified Step Test	Pool stairs into the water; low bench; aluminum therapy stairs.	Cardiorespiratory endurance. Balance. Agility. Coordination. Lower extremity strength and endurance.	Record number of completed climbs of one step-lift one foot up, follow with second foot, place one foot down, follow with second, continuing for 60 (30,15,90) seconds. Compare pulse rates before and after activity; record pulse recovery time.
#2 Cone Obstacle Course	Plastic cones, markers or sand filled plastic jugs; lines on pool bottom.	Balance. Agility. Gait training. Locomotor movements and patterns.	Place markers in an irregular pattern. Walk in forward, backward, and sideward fashions between and around markers. Use lines on pool bottom as balance beams.
#3 Extension Pole	Fasten reaching assist pole to pool wall and weight end down in water to form a sloping angle.	Lower extremity strength and endurance. Gait training. Agility. Coordination. Submerging.	Step over pole at various heights. Move in forward, backward, and sideward fashions. Duck under pole. Step over pole in one direction and duck under in the other direction.
#4 Hula Hoop	Hula hoops; rope tied in a circle; garden hose shaped as circle and held with wooden pegs or dowels.	Upper extremity flexibility--for enhancing daily living skills requiring reaching. Agility. Coordination.	Lift hoop over head--one or two hands--and draw down to feet. Step out of hoop. Repeat starting from feet to head.
#5 Water Chair	Water table; chairs adapted equipment to provide needed flat surface.	Trunk, abdominal, and lower extremity strength and endurance. Cardiorespiratory endurance. Range of motion.	Kick with extended or flexed knees from sitting, prone, or supine positions. Kick at a moderate (slow, fast) speed for total time period or at maximum speed for 30 seconds; rest 10 to 15 seconds; repeat kicking for 30 seconds.

Station	Equipment	Training Benefits	Activities
#6 Upper Extremity Exercises	Unfilled plastic jugs; inflatable plastic floats.	Upper extremity strength, and endurance. Flexibility. Range of Motion.	Add resistance for arm exercises by grasping unfilled plastic jugs or inflatable floats when performing exercises described on page 9. Increase or decrease resistance by size of jug or float, or by amount of air in the object.
#7 Lower Extremity Exercises.	Water chair; table; inflatable floats that can be placed around the ankles.	Lower extremity, trunk, and abdominal strength and endurance. Range of Motion. Flexibility.	Add resistance for lower extremity exercises by placing floats around ankles when performing exercises described on page 10.
#8 Water Stairs	Water stairs; adapted benches.	Gait training--ascending and descending stairs. Balance. Locomotor movements and patterns.	Ascend and descend water stairs.
#9 Parallel Bars	Aquatic parallel bars.	Upper extremity and trunk strength and endurance. Coordination.	Perform exercises described on pages 11, 12, 13.
#10 Bucket and Hoop Games	Plastic bucket--place weights in bottom to hold it down; rubber rings; small towels.	Foot and lower extremity flexibility, strength, and endurance. Balance.	Place rings and towel on bottom of the pool floor with the bucket in the middle. Use feet to pick-up and place articles into the bucket.

Weight Training

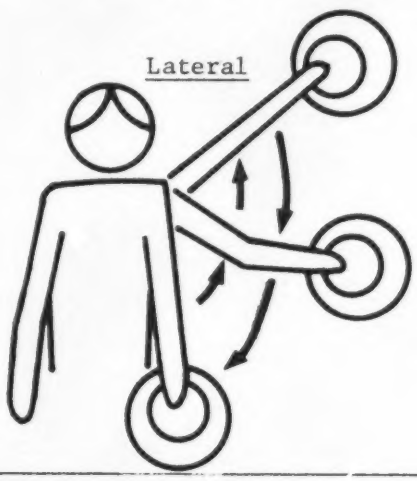
Exercises performed with water floats as additonal weights benefit muscular strength and endurance and range of motion. Increase work load by adding additional floats; increase speed and repetitions; require use of two limbs at the same time while keeping the body in a well aligned and balanced position.

Arms and Shoulders

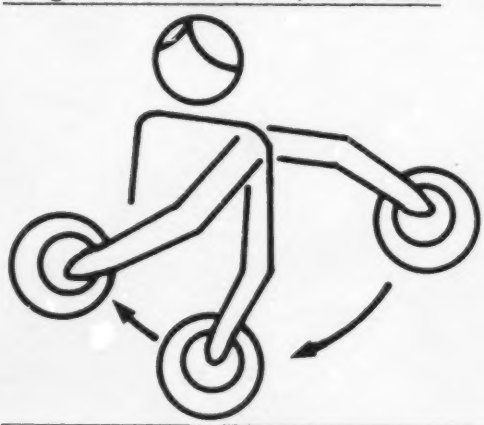
Drag floats through water and lift them up and out of water in these directions --

Front to Back

Lateral



Single arm abduction/adduction



Double arm abduction/adduction

Shoulder elevation-depression

Wrist--smooth water out with hand

Twist-turn float over with hand under water

Lower Extremities

Perform the following exercises in sitting positions in directions and ways shown (add floats around ankles for additional resistance and training benefits) --

Abduction/adduction.

Knee flexion/extension.

Single extended leg flexion/ extension.

Double extended leg flexion/ extension.

BAR EXERCISES

Illustrations below depict adapted gymnastic activities for use in aquatic programs. Exercises using simple equipment and exercise parallel bars can benefit and maintain muscular strength and endurance, range of motion, flexibility, coordination, and cardiorespiratory endurance.

Although many of the following exercises require performance by strong individuals, adaptations in repetitions and times of performances can allow for success by individuals with less strength and endurance. Perform these exercises with the trunk of the body in a straight, stable position, arms extended, and if possible, knees flexed and drawn up to the chest.

Arm Supports
Hold for X seconds; shift weight to the right, left, forward, backward, up, and down.

Arm Walk
Walk with arms in forward, backward, sideward, and hand-over-hand fashions.

Arm and Shoulder Support
Support body on the bars in a prone position with extended arms (Fig. 1); roll to supine by lifting one arm up and over to bar (Fig. 2); re-grasp bar with hands (Fig. 3); and roll to supine by lifting over hand up and over (Fig. 4); roll back to prone position in the same manner.

Fig. 1

Fig. 2

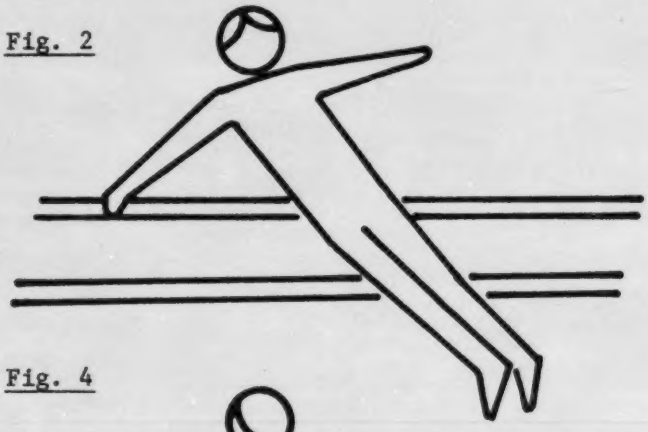


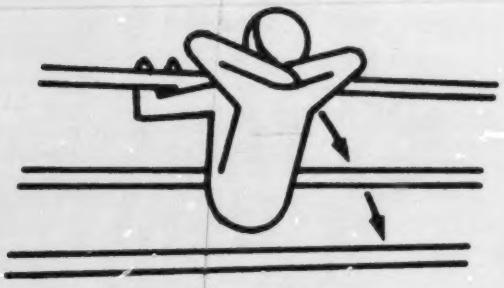
Fig. 3

Fig. 4

Sit Ups

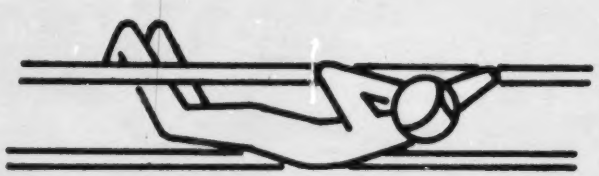
Start in a relaxed position with arms at sides, knees flexed, bottom on bar, and feet under side bar; provide assistance if necessary.

Lift up to a sitting position and lower back down to a sitting position on the parallel bar.



The Bananna

For upper extremity and trunk strength and endurance. In a prone position with hips on the bar and legs under the bar, clasp hands behind head and lift trunk upward and hold; lower back to prone position.



The Bell

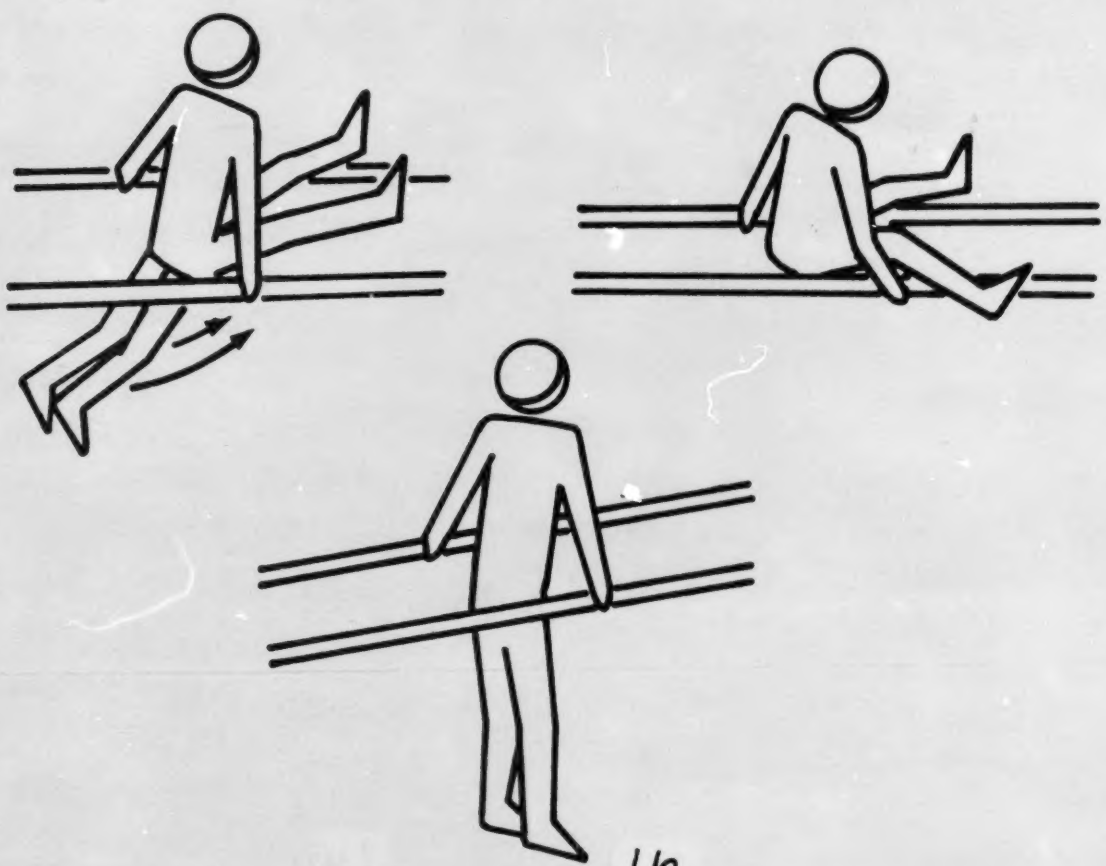
For lower extremity and abdominal strength. With extended arms, trunk, and legs, draw legs in designated direction by using abdominal muscles; add extra weights if greater work load is necessary; draw legs up-front-diagonal-back in a pendular motion; increase speed and trials for increased work load.

Interval Training on Parallel Bars

Benefits cardio-respiratory endurance, upper and lower extremity strength and endurance. Cycle or kick legs (from hips) while in a prone, supine, and neutral positions (at top speed for 10/15/20 seconds with extended arms on bars and then slowly for 5/10/10 seconds); repeat intervals of desired times for 4/4/3 repetions.

The Frog Walk

Start with legs extended and swing them up and back from a straddle position and then place legs forward on the bars; shift weight forward and grasp bars with hands between bars; lift legs off and over bars and back to neutral position.



INTERVAL TRAINING

Swimming for physical conditioning and competition can be accomplished through interval training. This training, performed in a strict manner which can include taking pulse and swimming times, requires a highly disciplined and motivated performer for continuing such a program. Interval training can consist of--

- Recording resting pulse before swimming a designated distance--i.e., from one to eight lengths or 12.5 meters to 100 meters.
- Recording swimming time and pulse after swimming.
- Resting for one-half the swimming time.
- Repeating training distance using alternate swimming strokes.

Interval Training Record Sheet

Swim Stroke	Distance	Pulse before	Pulse after	Swim time
Back Stroke				
Front Crawl				
Breast Stroke				
Butterfly				
Sidestroke				

Interval training can also be used to fit conditioning objectives and needs of individual performers by --

- Increasing number of repititions.
- Varying distances swam--one/two width(s), one/two length(s), 25 yards, 50 meters, 100 yards.
- Regulating speed of swim.
- Shortening rest intervals between swims.
- Controlling action during rest or recovery intervals-- walk, float, bob, tread; discourage sitting or lying down during rest or recovery intervals.

Emphasis in interval training can be upon swimming speed and pace so timing widths, laps, and recovery intervals can become an important part of these activities. It should be noted that walking, running, other basic locomotor activities, and various exercises in water can be used in these same ways by

nonswimmers. Examples of interval training routines that can be done following a thorough warm-up are --

Crawl stroke two laps.	Back stroke kick two laps.
Rest stroke one lap.	Rest stroke one lap.
Bob or rhythmic breathe two minutes.	Backstroke arm stroke one lap.
Repeat pattern three or four times	Tread water one minute.
	Repeat pattern three or four times.

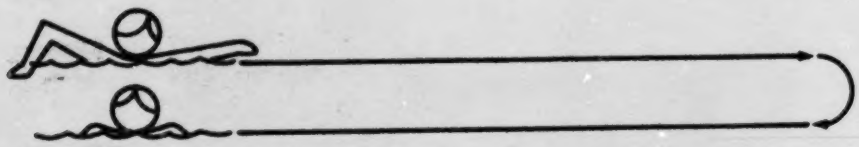
Crawl stroke 50-yards 2 seconds slower than best or goal time	Float or rest stroke 2 minutes.	Repeat pattern three times.

ALTERNATE SWIMMING

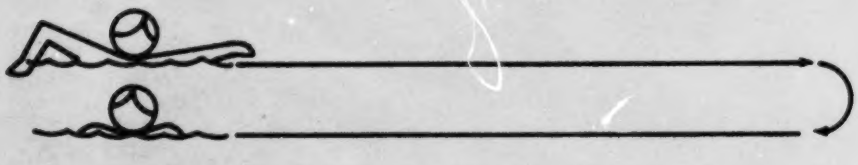
Alternate swimming is a variation of interval training that allows for swimming conditioning for one or several performers and the trainer (if possible) in a highly motivating manner. Less time is spent recording pulse rate and swimming time for individuals who are not in need of such stress. Alternate swimming can be one station in an aquatic circuit.

Training begins with X lengths of swimming by Performer 1 (P1). Performer 2 (P2), swims X lengths following completion by P1. Training continues with performers alternating and decreasing distance by one length on each alteration of swimmers. Times can be recorded for trials on daily, weekly, or bi-weekly bases. Key to this training approach is physical conditioning through competition in which each performer strives to give the other swimmer the <u>least</u> possible resting time. Repetitions of sets are determined by individual needs of performers.

PERFORMER 1

Rest  Return

PERFORMER 2

Rest  Return

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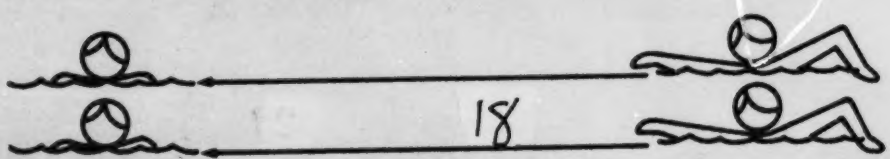
PERFORMER 1 Rest

PERFORMER 2  Rest

Alternate Swimming Record Sheet

Swim Stroke	Swimming distance and time of swim							
	P1	P2	P1	P2	P1	P2	P1	P2
	100 m		75 m		50 m		12.5 m	
Back Stroke								
Front Crawl